The Value of Citizen Scientists: Data Collection for American Eel Using Non-Traditional Field Gear and Social Media

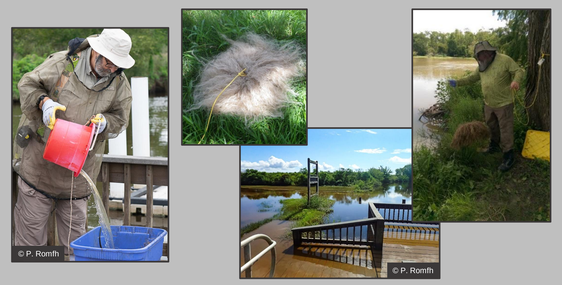
Stephen Curtis[1*], Melissa Casarez[2] and Sarah Robertson[1]

[1]Texas Parks and Wildlife Department, Inland Fisheries, River Studies Program – San Marcos, Texas

[2]University of Texas, Biodiversity Research Collections, Department of Integrative Biology – Austin, Texas

Introduction

- Citizen scientists are a valuable resource to assist with ecological monitoring and natural resource management projects.
- In Texas, our primary group of organized citizen scientists are the Texas Master Naturalists who are comprised of 48 Chapters across the state.
- Each year, Texas Master Naturalists log 400,000+ hours of volunteer time on environmental projects valued at approximately $10 million.
- In an effort to leverage limited resources, cover a wide geographic area and gather as much data as possible, citizen scientists were recruited to assist with field sampling, provide location data and donate specimens to help assess the status of American Eel in Texas.



Outreach Efforts & Methods

Glass Eels & Elvers: Eel Mop Monitoring

- Outreach Efforts
  - Requested assistance from coastal Chapters of the Texas Master Naturalists
  - Provided an overview of the project with instructions on how to construct and sample with an eel mop(followed the Hudson River Estuary Program's methods)
  - Equipped members with all necessary gear and datasheets to independently use eel mops
- Field Methods
  - Eel mops secured to bank and deployed continuously
  - Eel mops checked at a minimum of every two weeks; eel-like individuals bagged and frozen
  - All catch was recorded on datasheets or Google Form as an occurrence record; individuals were counted at several sites

Yellow Eels: Anecdotal Records & Donated Individuals

- Outreach Efforts
  - Primarily utilized social networks including Facebook and iNaturalist, to highlight American Eel research and request locale data and specimens
  - Published a call for eel via a UT Wanted Poster and TPWD Press Release
- Data Compilation
  - Catalogued all responses and requested additional information when needed to confirm identification and determine location and date
  - Provided instructions for retaining individuals and coordinated collection of specimens

Glass Eels & Elvers: Eel Mop Monitoring

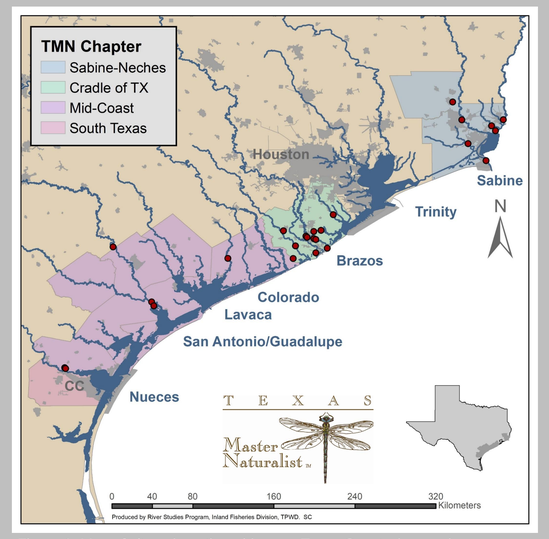


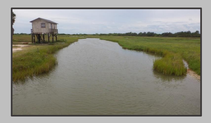
Figure 1. Map of sites along the mid-upper Texas Coast where eel mops were deployed to sample for juvenile American Eel; Alamo Area Chapter not pictured.

Sampling Effort

- Five Texas Master Naturalist Chapters deployed eel mops across 25 sites along the mid-upper Texas Coast
- Continuous sampling time in the water ranged from two weeks to 24 months (Timeframe: Feb 2018 – Present)
- Eel mops were deployed for a total of 4,510 nights (108,240 hours) and checked a total of 217 times
- Master Naturalists logged a total of 725.8 hours valued at $17,418

Catch

- Catch data were reported for 15 out of 25 sites; two mops were lost to flooding and one to vandalism
- No American Eel were collected
- *Occurrence:* Out of 217 mop checks, 65% yielded crabs, 50% shrimp, 31% insects/worms and 30% non-target fish
- *Relative Abundance:* Individuals were counted from 141 mop checks; of the 6,295 individuals, 71% were crabs, 12% other (bivalves/plankton) and 7% shrimp



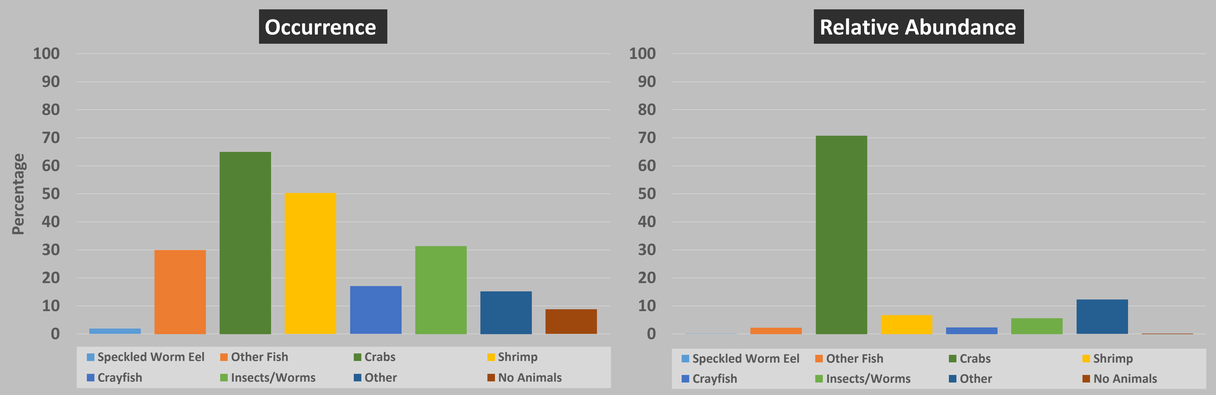


Figure 2. Combined catch data for eel mops across 15 sites along the mid-upper Texas Coast; data from 217 mop checks displayed by occurrence (%) on the left and data from 141 mop checks displayed by relative abundance (%) on the right.

Yellow Eels: Anecdotal Records & Donated Individuals

Anecdotal Records

- 129 reports from citizen scientists of one or more American Eel
- Location data was provided or confidently estimated for 109 of those reports from across the state

Donated Individuals

- A total of 114 specimens from 34 sites were collected from citizen scientists, academic researchers and natural resource managers
- Citizen scientists donated 23 individuals from six sites (~20% of the yellow eels received for this project)

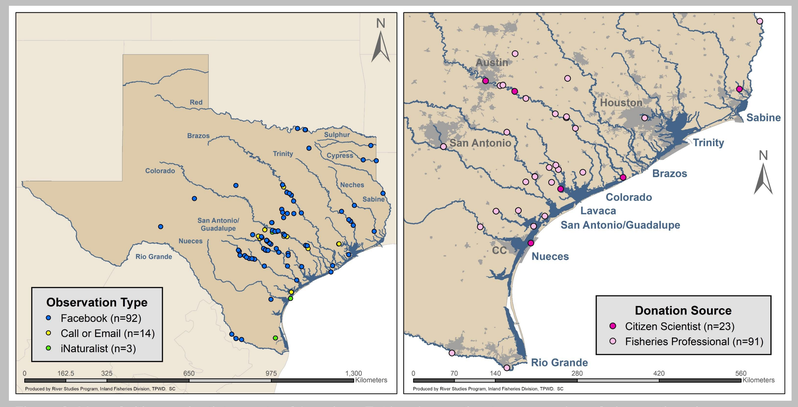


Figure 3. Map of citizen scientist reports of American Eel by observation type – number of observations in parenthesis (left); map of sites where yellow eels were collected and donated by citizen scientists – number of eels in parenthesis (right).

Conclusions & Future Work

- More than 150 citizen scientists participated in this project to support American Eel research.

Benefits

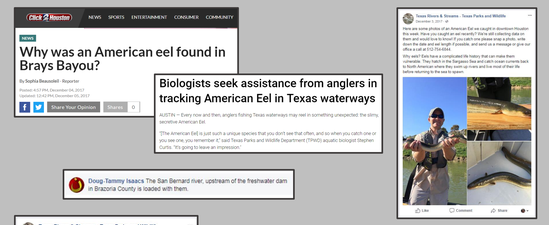
- Citizen scientists provided a level of field effort that would have not been possible using traditional approaches to data collection.
- Historical records of American Eel were reported for almost every major river basin in the state and dated back to the 1940s.
- The majority of the specimens from coastal locations were donated by citizen scientists and included the first potential silver eel documented in Texas.

Challenges

- It is logistically demanding to coordinate a state-wide citizen science monitoring program and collect data and specimens using non-traditional methods.
- The quality and type of data received through citizen science monitoring and observations can vary widely and include missing, incomplete or inaccurate data.

The benefits of working with citizen scientists far outweigh any of the challenges!

- Authors will continue efforts to gather remaining eel mop monitoring data, process and georeference anecdotal records, and accept specimens from citizen scientists.



Acknowledgments

- Thank you to the devoted citizen scientists of the following Texas Master Naturalist Chapters who sampled for glass eel and elvers along the Texas Coast: Sabine-Neches, Cradle of Texas, Mid-Coast, South Texas and Alamo Area
- Thank you to Emily Smith for processing and georeferencing social media records
- Thank you to the many citizen scientists who reported records of eels and donated individuals to this project

*Contact Stephen Curtis at Stephen.Curtis@tpwd.texas.gov